

cable 310 extends around a predetermined perimeter (not shown). As with the embodiments discussed above, the wheel 12 of the shopping cart 22 will lock up once it passes over the buried wire cable 310.

In this embodiment, the signal generator 308 generates a second signal, namely an exit disarm signal. The exit disarm signal is transmitted through an exit disarm cable 312. The exit disarm cable 312 is partially insulated by a shielding material 314 as is known in the art so as not to affect the anti-theft vehicle system 300 at those points. Other portions of the exit disarm cable 312 are not shielded. A portion 316 of the exit disarm cable 312 extends out of the retail store 302 adjacent to the doorway 304. Another portion 318 of the exit disarm cable 312 extends across retail store check-out counters 320. The exit disarm signal 312 momentarily disarms the wheel 12 of the shopping cart 22. This allows the shopping cart 22 to pass through the doorway 304 and over the buried wire cable 310 which carries the signal to activate the wheel 12.

By routing the buried wire cable 310 across the doorway 304, theft of merchandise by exiting the doorway 304 with a cart full of merchandise is prevented because the anti-theft vehicle system 300 will prevent the shopping cart 22 from passing through the doorway 304 by locking the wheel 12. The only way, therefore, that the shopping cart 22 may exit the retail store 302 is by passing over the second portion 318 of the exit disarm cable 312 by passing through a check-out counter 320 and paying for the merchandise. It should be appreciated that in lieu of a floor or exit threshold disarm loop, the disarm signal may be manually delivered from a remotely transportable transmitter, previously described, to disarm the wheel 12 of the shopping cart 22 to allow the shopping cart 22 to exit the retail store 302.

The first portion 316 of the exit disarm cable 312 extends out from the retail store 302 adjacent the doorway 304. The first portion 316 of the exit disarm cable 312 prevents the anti-theft vehicle system 300 from locking up the wheel 12 of the shopping cart 22 as the shopping cart 22 re-enters the retail store 302 through the doorway 304. More specifically, the shopping carts 22 may enter the retail store 302 freely and are inhibited from exiting the retail store 302 through the doorway 304 unless they pass by a check-out counter 320 and over the exit disarm cable 312. It should be appreciated that, if the shopping cart 22 enters the retail store 302, it will pass over the exit disarm cable 312 prior to the buried wire cable 310.

The present invention has been described in an illustrative manner. It is to be understood that the terminology which has been used is intended to be in the nature of words of description rather than of limitation.

Many modifications and variations of the present invention are possible in light of the above teachings. Therefore, within the scope of the appended claims, the present invention may be practiced other than as specifically described.

What is claimed is:

1. An anti-theft vehicle system for a vehicle wheel having a rotational axis comprising:

a signal generator to generate a first predetermined signal around a first predetermined perimeter and to generate a second predetermined signal around a second predetermined perimeter at least partially disposed within the first predetermined perimeter;

at least one inhibitor disposed within the vehicle wheel to selectively engage and disengage the vehicle wheel to resist and allow rotational movement of the vehicle wheel about the rotational axis;

a rotatable structure disposed within the vehicle wheel and cooperating with said at least one inhibitor for moving said at least one inhibitor between an engaged position and a disengaged position with respect to the vehicle wheel; and

a receiver disposed within the vehicle wheel to receive the first predetermined signal and second predetermined signal to activate said rotatable structure to move said at least one inhibitor between said engaged position and said disengaged position.

2. An anti-theft vehicle system as set forth in claim 1 including a first buried wire cable for transmitting the first predetermined signal.

3. An anti-theft vehicle system as set forth in claim 2 including a second buried wire cable for transmitting the second predetermined signal.

4. An anti-theft vehicle system as set forth in claim 3 including a shielding material for insulating a portion of said second buried wire cable from said first buried wire cable.

5. An anti-theft vehicle system as set forth in claim 3 wherein said signal generator includes an amplifier and a potentiometer for controlling the level of signal output by said amplifier.

6. An anti-theft vehicle system as set forth in claim 5 wherein said first buried wire cable includes a plurality of branches connected to said amplifier.

7. An anti-theft vehicle system for a vehicle wheel having a rotational axis comprising:

at least one inhibitor disposed within the vehicle wheel to selectively engage and disengage the vehicle wheel to resist and allow rotational movement of the vehicle wheel about the rotational axis;

rotatable means disposed within the vehicle wheel and cooperating with said at least one inhibitor for moving said at least one inhibitor between an engaged position and a disengaged position with respect to the vehicle wheel;

a transmitting circuit for generating a first predetermined signal defining a first predetermined spatial perimeter and for generating a second predetermined signal defining a second predetermined spatial perimeter at least partially disposed within the first predetermined spatial perimeter; and

a receiving circuit disposed within the vehicle wheel for receiving the first predetermined signal and second predetermined signal to activate said rotatable means to move said at least one inhibitor between said engaged position and said disengaged position when the vehicle wheel passes the predetermined spatial perimeter.

8. An anti-theft vehicle system as set forth in claim 7 wherein said transmitting circuit includes an oscillator to create at least one carrier frequency.

9. An anti-theft vehicle system as set forth in claim 8 wherein said oscillator creates the at least one carrier frequency at a frequency less than nine kilohertz.

10. An anti-theft vehicle system as set forth in claim 7 wherein said transmitting circuit includes at least one antenna of electrically conductive material to transmit the first predetermined signal along and define the first predetermined spatial perimeter.

11. An anti-theft vehicle system as set forth in claim 7 wherein said transmitting circuit includes a remotely transportable transmitter for transmitting the second predetermined signal to move said at least one inhibitor between said engaged position and disengaged position.

12. An anti-theft vehicle system as set forth in claim 7 wherein said transmitting circuit includes a low pass filter to eliminate carrier harmonics of the predetermined signal.

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13. An anti-theft vehicle system as set forth in claim 7 wherein said transmitting circuit includes an amplifier and a potentiometer for controlling the level of signal output by said amplifier.

14. An anti-theft vehicle system for a vehicle comprising:  
 a transmitter to generate a predetermined signal around a predetermined spatial perimeter;  
 a plurality of antennas connected to said transmitter to transmit the predetermined signal along and define the predetermined spatial perimeter;  
 at least one vehicle wheel;  
 at least one inhibitor disposed within the at least one vehicle wheel to selectively engage and disengage the at least one vehicle wheel to resist and allow rotational movement of the at least one vehicle wheel;  
 a rotatable structure disposed within the at least one vehicle wheel and cooperating with said at least one inhibitor for moving said at least one inhibitor between an engaged position and a disengaged position with respect to the at least one vehicle wheel; and  
 a receiving circuit disposed within the at least one vehicle wheel to receive the predetermined signal to activate said rotatable structure to move said at least one inhibitor between said engaged position and said disengaged position.

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15. An anti-theft vehicle system as set forth in claim 14 wherein said receiving circuit includes a resonant tank circuit to eliminate reception by said receiving circuit of all frequencies other than frequencies of the predetermined signal.

16. An anti-theft vehicle system as set forth in claim 15 wherein said receiving circuit includes a detector electrically connected to said resonant tank circuit to receive the predetermined signal.

17. An anti-theft vehicle system as set forth in claim 16 wherein said receiving circuit includes a gain stage circuit electrically connected to said detector to amplify the predetermined signal after the predetermined signal has been received and detected.

18. An anti-theft vehicle system as set forth in claim 14 wherein said transmitter includes an amplifier.

19. An anti-theft vehicle system as set forth in claim 14 wherein said transmitter includes a remotely transportable transmitter for transmitting the signal to move said at least one inhibitor between said engaged position and disengaged position.

20. An anti-theft vehicle system as set forth in claim 14 including a low pass filter to eliminate carrier harmonics of the predetermined signal.

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